ABSTRACT OF THE DISCLOSURE

A method and apparatus for welding with an engine driven inverter power supply includes generating an ac output with an engine and generator. The output is rectified and inverted to provide an ac inverter output. The engine is controlled using feedback indicative of a welding output operating parameter. The feedback may also be taken from the inverter or generator, and the generator may be controlled instead of or in addition to the engine. Engine parameters that may be controlled include engine speed, selecting between an idle speed and a run speed, a throttle position, a fuel pump, an injection timer, a fuel to air ratio, fuel consumption and ignition timing. Another aspect of the invention is having the feedback be responsive to one or more of the welding current, welding voltage, welding power, or functions thereof. The feedback may be responsive to the current, voltage, power, ripple and functions thereof. An aux power output is derived directly from the generator and feedback from the aux load is used to determine if the engine should be idling or running at high speed.